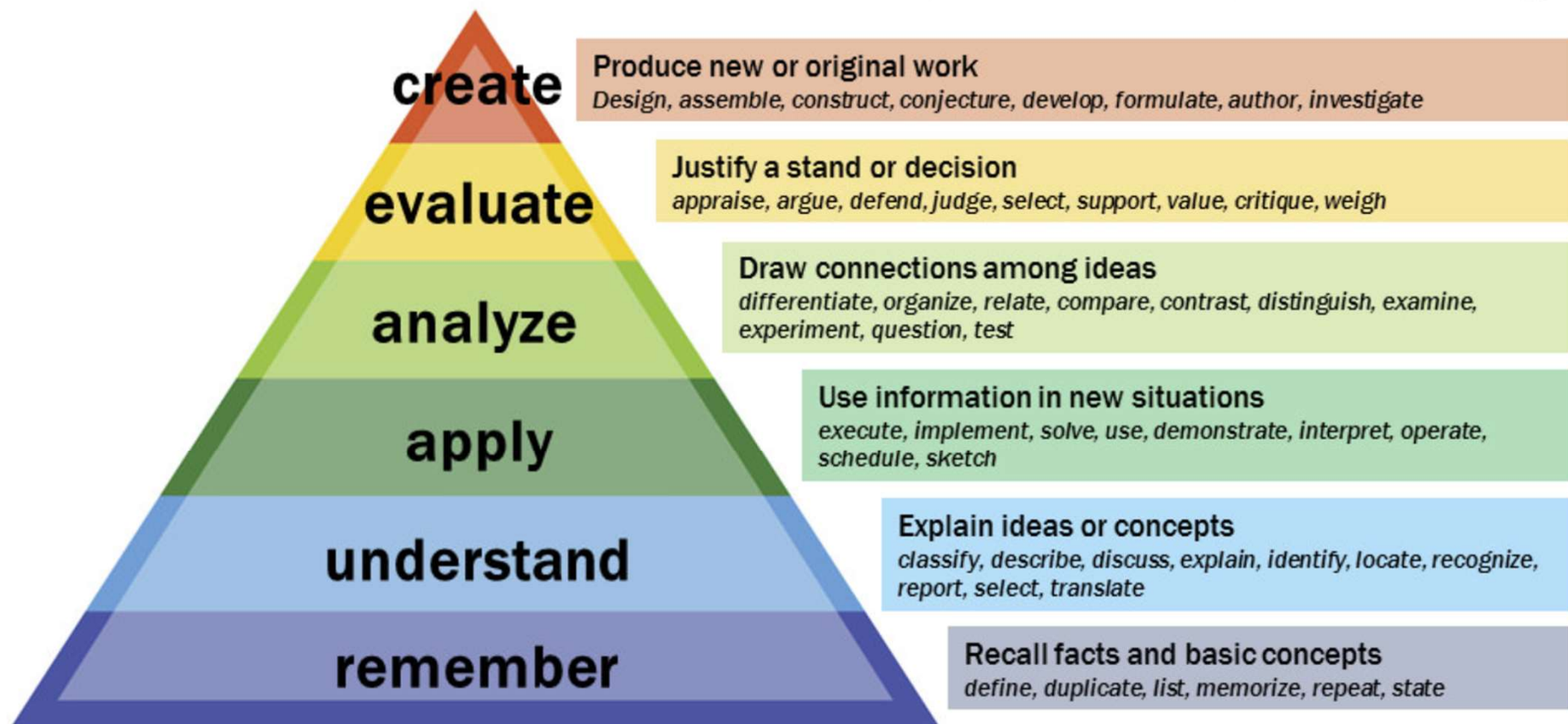


OPIM 302

The new ERA

Credits for some of these slides go to Carlota Perez, Ray Kurtzweil

Bloom's Taxonomy



Changing Business Environment?

- China – New sweat worker
- EIU predictions-60 years into the future:

Globalcorp 2066?

1. Exxon-Hydro
2. Tatasoft
3. Quaero
4. GGS (formerly Google Goldman Sachs)
5. Shanghai Automotive
6. RambaxiPfizerSmithKlineBeechamNovartis
7. OxbridgeHarvard
8. MyMcSpace
9. WholefoodsTesco
10. BollyDisney

Watch the video below:

<https://www.youtube.com/watch?v=Z93yWXb9Tb05>

Do you see a pattern?

Largest companies in the World

Rank ↕	Name ↕	Industry ↕	Revenue ↕	Profit ↕	Employees ↕	Country ^[note 1] ↕	Ref
			USD millions				
1	Walmart	Retail	▲ \$523,964	\$14,881	2,200,000	 United States	[4]
2	Sinopec Group	Oil and gas	▼ \$407,009	\$6,793	582,648	 China	[5]
3	Royal Dutch Shell	Oil and gas	▼ \$388,379	\$15,842	83,000	 Netherlands	[6]
						 United Kingdom	
4	Amazon	Retail	▲ \$386,100	\$11,588	1,225,300	 United States	[7]
5	State Grid	Electricity	▼ \$383,906	\$7,970	907,677	 China	[8]
6	China National Petroleum	Oil and gas	▼ \$379,130	\$4,433	1,344,410	 China	[9]
7	Saudi Aramco	Oil and gas	▼ \$329,784	\$88,211	79,000	 Saudi Arabia	[10]
8	Volkswagen	Automotive	▲ \$282,760	\$15,542	671,205	 Germany	[11]
9	BP	Oil and gas	▼ \$282,610	\$4,026	72,500	 United Kingdom	[12]
10	Toyota	Automotive	▲ \$275,288	\$19,096	359,542	 Japan	[13]

Rank	First quarter	Second quarter	Third quarter	Fourth quarter
1	Microsoft ▼ 1,200,000 ^[13]	Apple Inc. ▲ 1,576,000 ^[14]	Apple Inc. ▲ 1,981,000 ^[14]	Apple Inc. ▲ 2,254,000 ^[14]
2	Apple Inc. ▼ 1,113,000 ^[14]	Microsoft ▲ 1,551,000 ^[13]	Microsoft ▲ 1,592,000 ^[13]	Microsoft ▲ 1,682,000 ^[13]
3	Amazon.com ▲ 970,590 ^[15]	Amazon.com ▲ 1,432,590 ^[15]	Amazon.com ▲ 1,577,000 ^[15]	Amazon.com ▲ 1,634,000 ^[15]
4	Alphabet Inc. ▼ 799,180 ^[16]	Alphabet Inc. ▲ 979,700 ^[16]	Alphabet Inc. ▲ 999,570 ^[16]	Alphabet Inc. ▲ 1,185,000 ^[16]
5	Alibaba Group ▼ 521,740 ^[17]	Facebook, Inc. ▲ 675,690 ^[18]	Alibaba Group ▲ 795,400 ^[17]	Facebook, Inc. ▲ 776,590 ^[18]
6	Facebook, Inc. ▼ 475,460 ^[18]	Tencent ▲ 620,920 ^[19]	Facebook, Inc. ▲ 746,100 ^[18]	Tencent ▲ 683,470 ^[19]
7	Tencent ▲ 471,660 ^[19]	Alibaba Group ▲ 579,740 ^[17]	Tencent ▲ 646,790 ^[19]	Tesla, Inc. ▲ 668,080 ^[20]
8	Berkshire Hathaway ▼ 440,830 ^[21]	Berkshire Hathaway ▼ 432,570 ^[21]	Berkshire Hathaway ▲ 509,470 ^[21]	Alibaba Group ▼ 628,650 ^[17]
9	Visa ▼ 357,020 ^[22]	Visa ▲ 412,710 ^[22]	Visa Inc. ▲ 425,510 ^[22]	TSMC ▲ 565,280 ^[23]
10	Johnson & Johnson ▼ 345,700 ^[24]	Johnson & Johnson ▲ 370,590 ^[24]	TSMC ▲ 420,440 ^[23]	Berkshire Hathaway ▲ 544,780 ^[21]

New Global Trends

- Council on Competitiveness
 - www.compete.org
 - Five for the future
 1. CHALLENGE the frontiers in science and technology
 2. RENEW access to secure and sustainable energy
 3. ACHIEVE advantage with creative and cutting-edge talent
 4. TRANSFORM risk intelligence into enterprise resilience
 5. ENGAGE in the global economy

Five for the Future-2

The Network as the Foundation for Innovation

Howard Charney

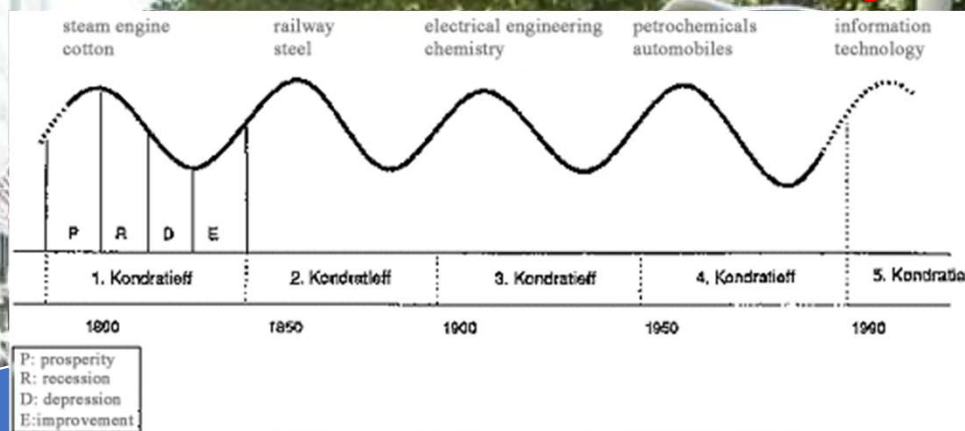
Senior Vice President, Cisco Systems, Inc.

Information technology (IT) and the Internet are transforming every sector of the global economy—and it is striking how swift the proliferation of these technologies has been. Before Sir Tim Berners-Lee launched the World Wide Web application in 1991, few people had even heard of the Internet. Since then, it has become almost as fundamental as electricity. More than one billion people have gone online, and everything from banking to manufacturing, transportation, medicine and the sciences now relies on Internet solutions and the global network.

The Venezuelan economist, Carlota Perez, has scrutinized the relationship between technology innovation and economic cycles, and she suggests that we are currently about halfway through a major technological revolution. According to the Perez model, every 50 to 60 years a signal innovation triggers a technology revolution that transforms every aspect of society. Professor Perez has identified five such cycles over the past 240 years, beginning with the Industrial Revolution in the 1770s. She argues that the current revolution was kicked off by the Intel 4004 in 1971. The telegraph, telephone and transistor all contributed, but it was the programmable microprocessor that launched the Information Age.

If the Perez model is correct, we should have 20 or 30 more years of productivity and growth (a “Golden Age”) ahead of us before the next big technology revolution kicks in. During that time Internet technologies will continue to evolve, and the Internet platform will continue to drive the engine of innovation worldwide.

More about economic cycles



Kondratieff (kondratieff) waves:

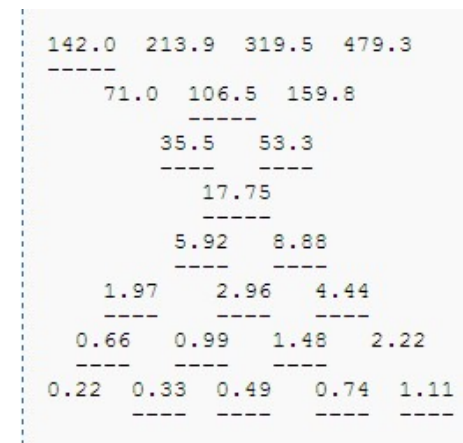
- Fifty to sixty years in length, the cycles consist of alternating periods between high sectoral growth and periods of slower growth in international production data.

Some economists divide the Kondratieff wave into two 'seasons', namely, the Fall (bull market) and the later part, the Winter (bear market).

The Charging Bull in Bowling Green, New York is a symbol of the bull market

Even more about cycles

- Edward Dewey (1930s)
 - Trying to understand the cause of great depression
 - Assigned by President Hoover
 - Came up with cycle theory
- Edwin F. Dakin published their book *Cycles: The Science of Prediction* :
 - United States economy was driven by four cycles of different length.
 - Milton Friedman dismissed their theory as pseudoscience



Joseph Schumpeter

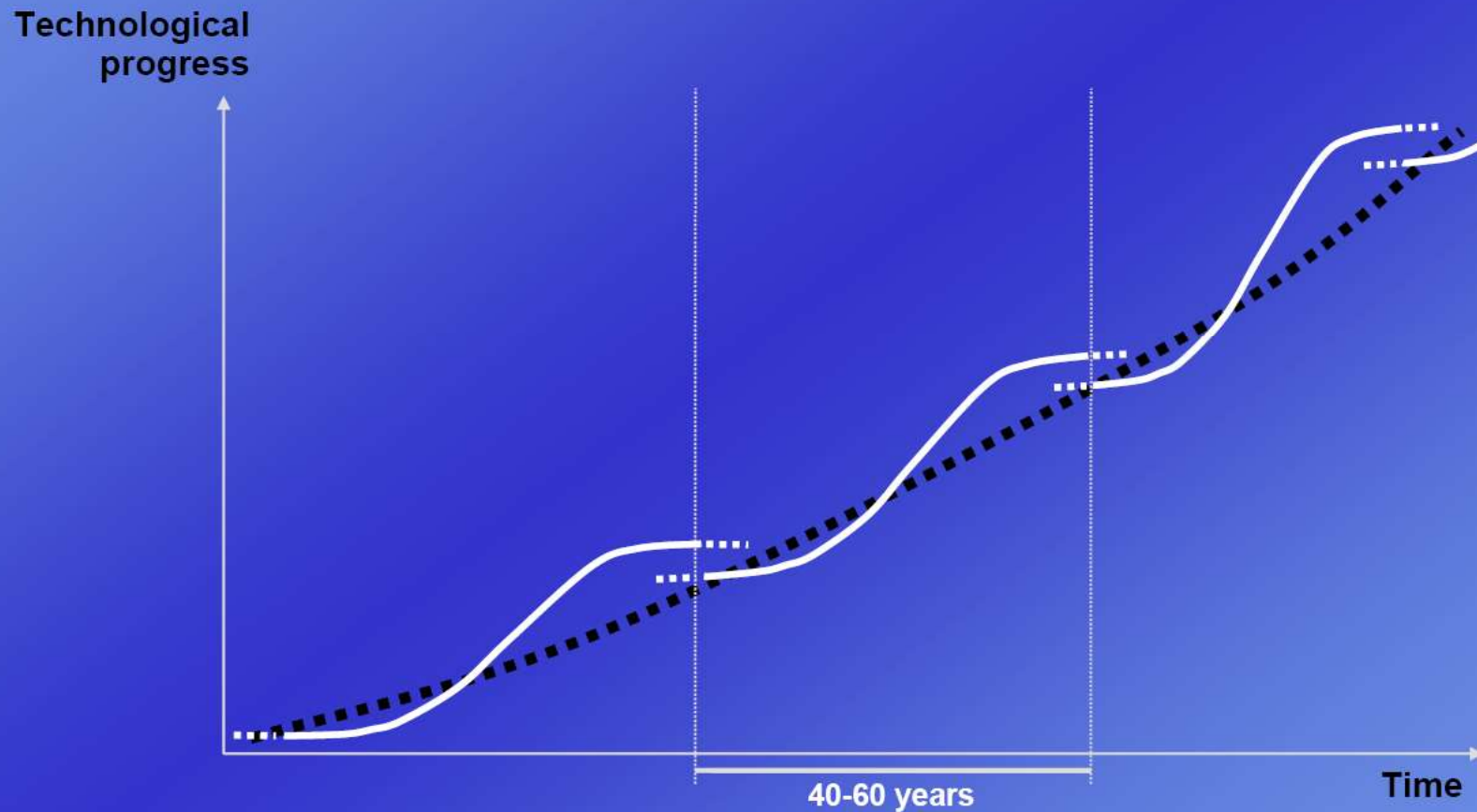
- Early 1900's
- Evolutionary economics:
 - Coined the term «creative destruction»
- Business cycles:
 - Kondratiev waves (55yrs)+ Kuznets (18yrs) + Juglar (9yrs), Kitchin (4yrs)
 - Together they form a composite waveform

Carlota Perez

- Past halfway through this information technology cycle
 - Installation period (20-30 years)
 - Best practice are radically modified
 - Standards developed
 - Deployment period (20-30 years)
 - Depth and breadth of transformation is achieved
- So far there have been 4 other cycles:
 - First: Industrial Revolution that began around 1771 when Arkwright's mill opened in Cromford.
 - Second: age of steam engines, coal, and iron railways
 - Third: Age of steel and heavy engineering. Civil, electrical, chemical, and naval engineering
 - Fourth: Age of oil, Henry Ford's Model T in 1908
 - Fifth: Began around 1971, first Intel microprocessor

More about this: <http://video.google.com/videoplay?docid=-1001377995735813750&q=Carlota+Perez&total=5&start=0&num=10&so=0&type=search&plindex=0>
Or just type in "Carlota Perez" at video.google.com.

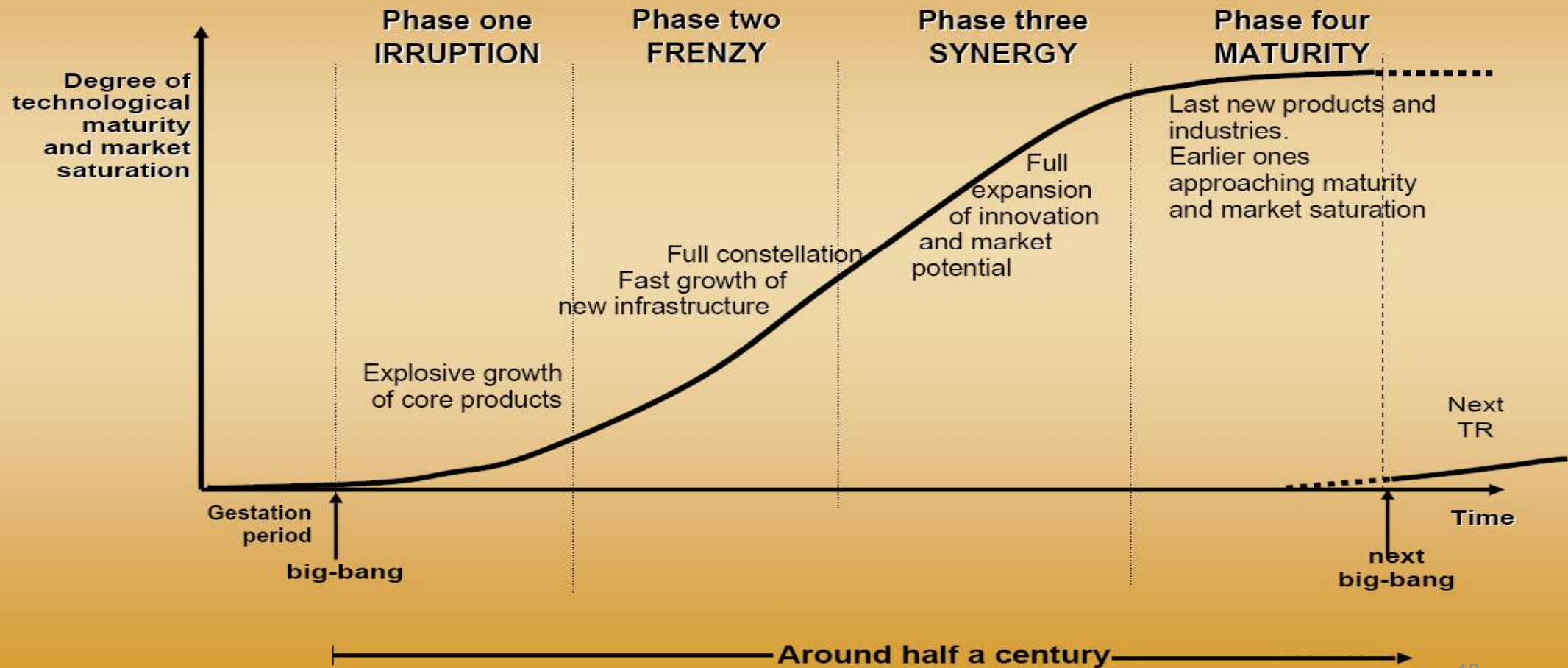
LONG-TERM DEVELOPMENT
LOOKS LIKE
THE RELENTLESS ADVANCE OF TECHNOLOGY...



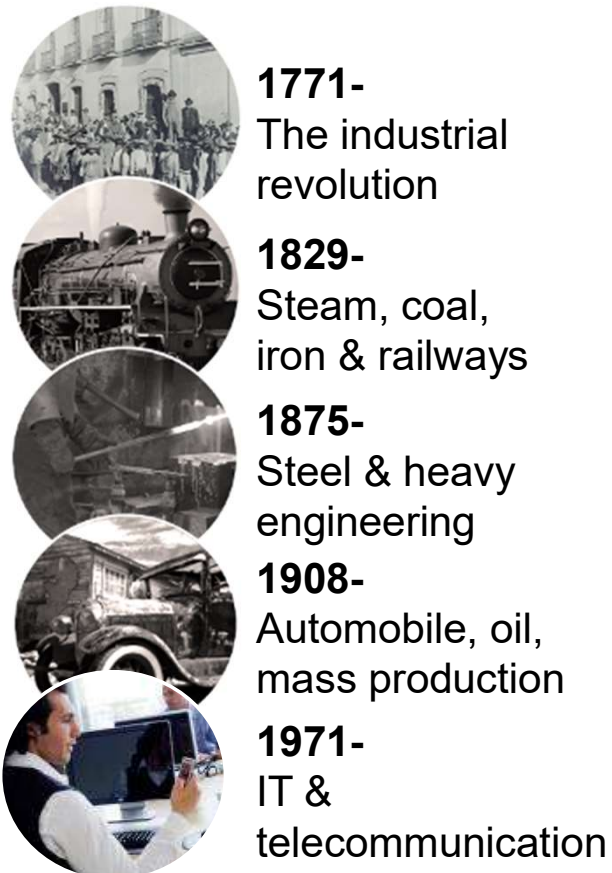
...but progress takes place by overlapping surges

Irruption, deployment and exhaustion

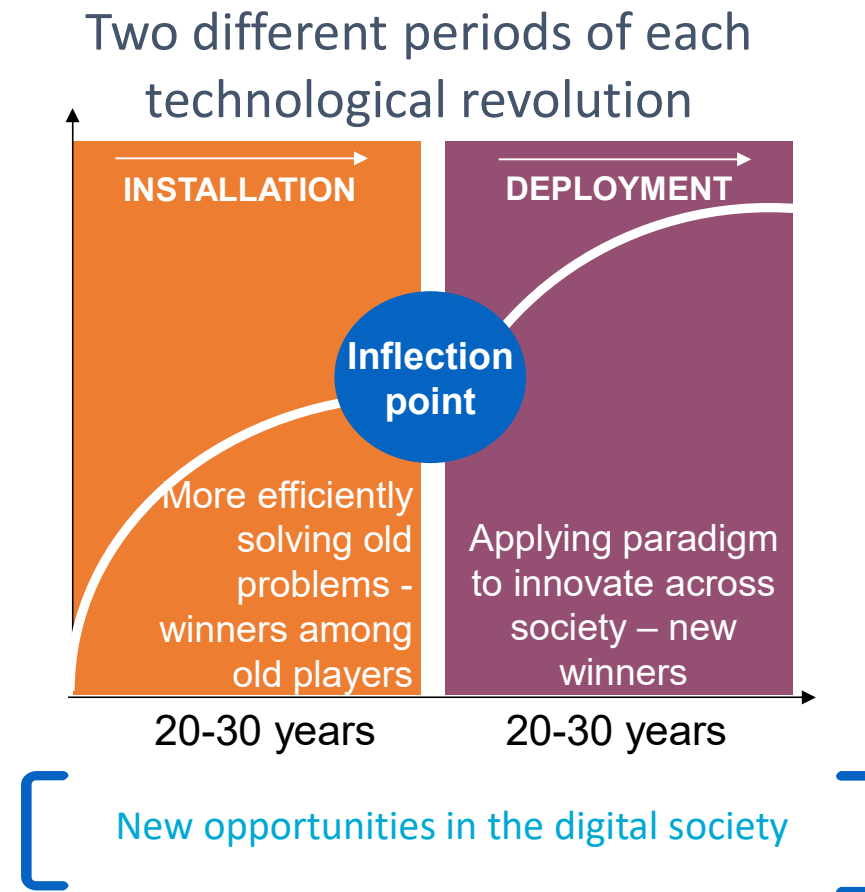
THE LIFE CYCLE OF A TECHNOLOGICAL REVOLUTION



Inflection points

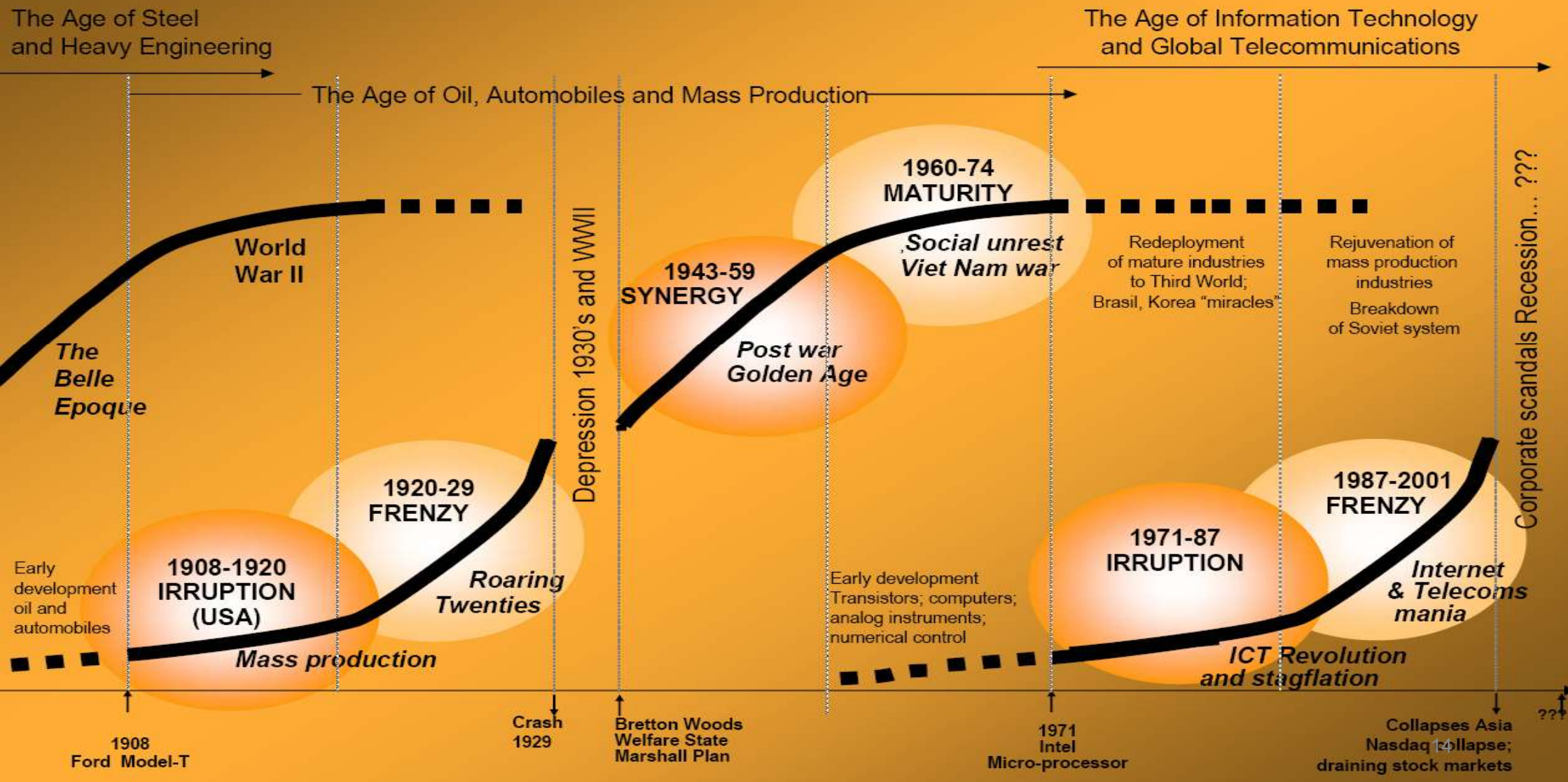


Source: Professor Carlota Perez
Universities of Cambridge, Tallinn and Sussex



Two different phases in each period

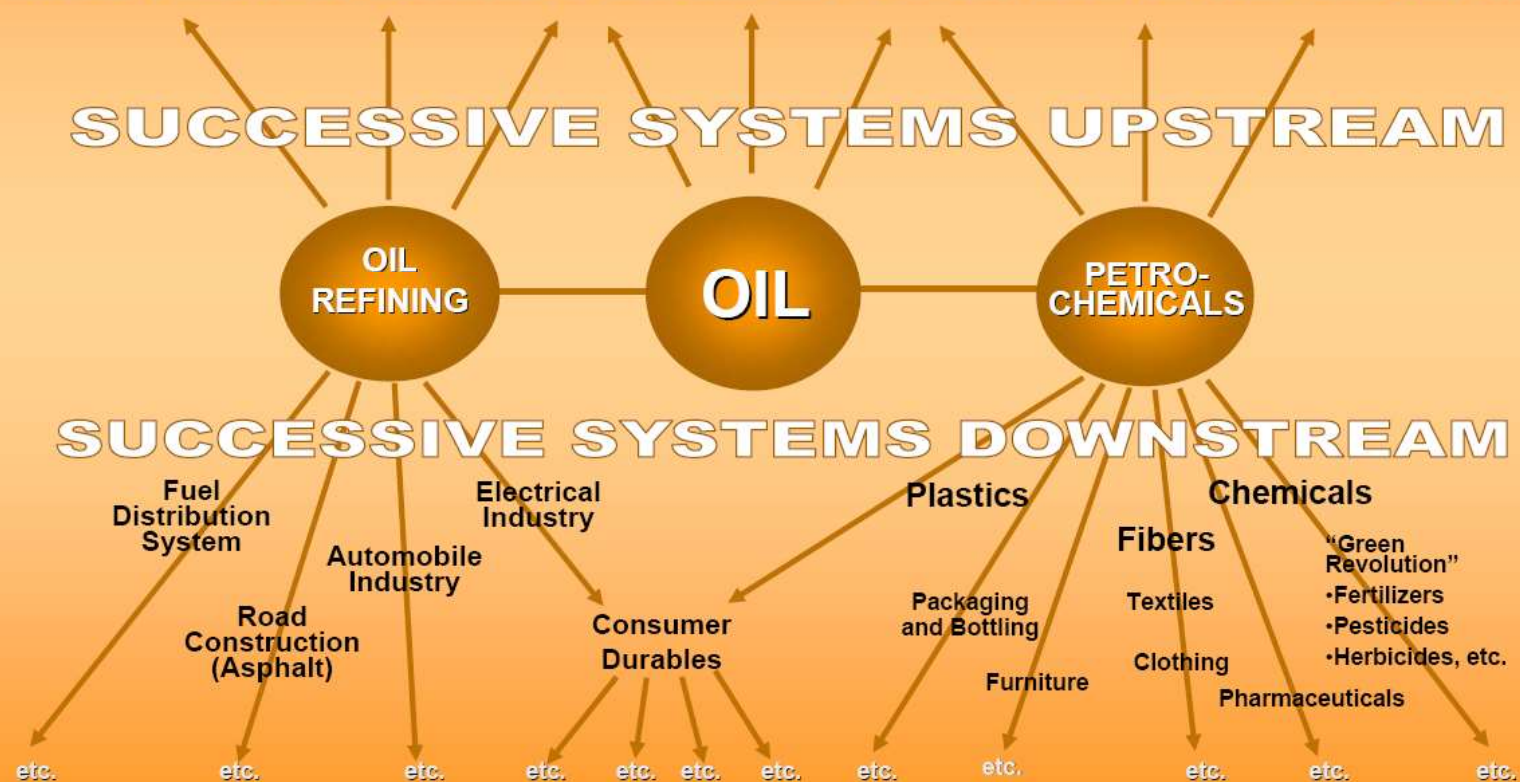
THE SUCCESSION OF PARADIGMS IN THE TWENTIETH CENTURY



An opportunity explosion

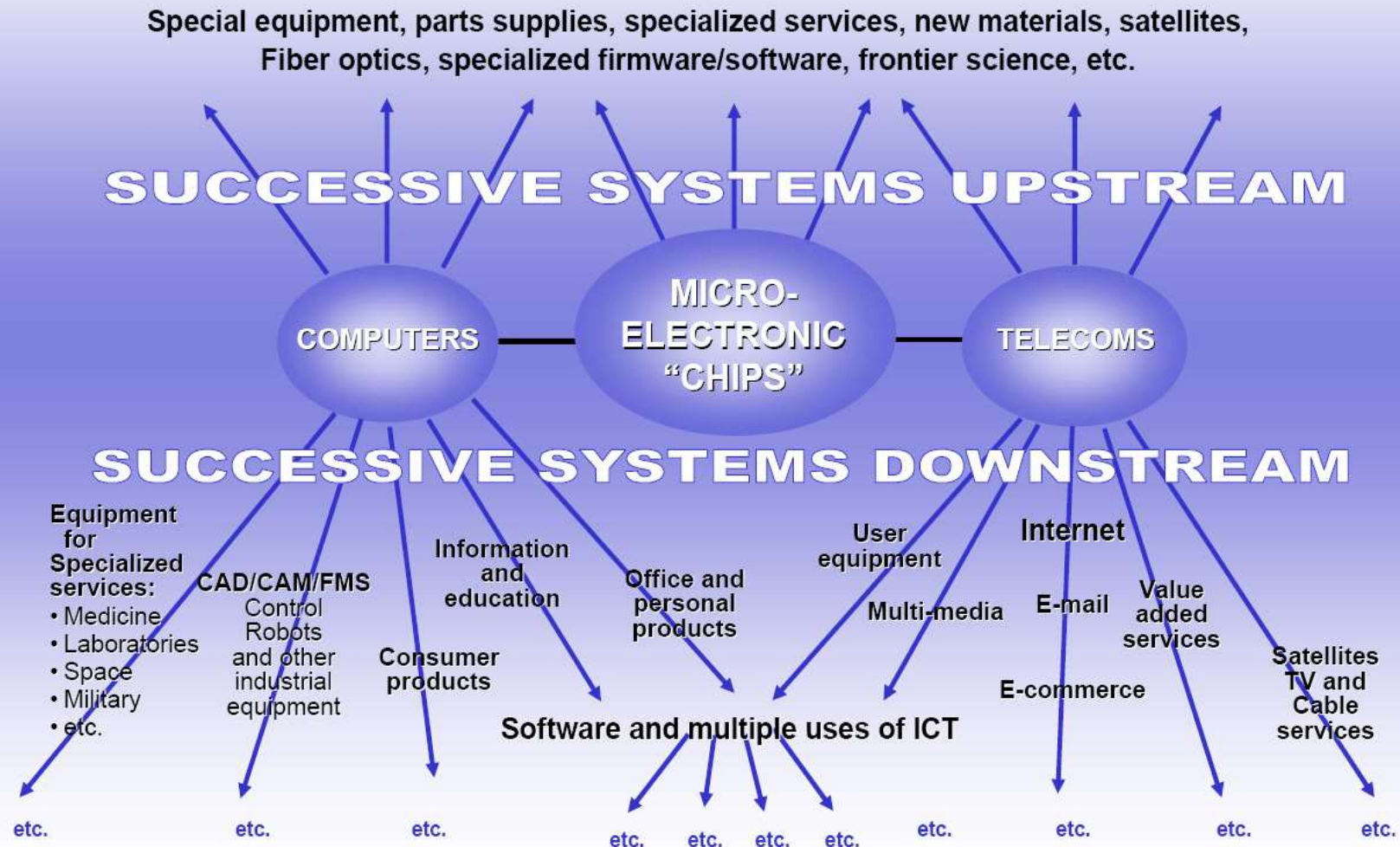
THE MASS PRODUCTION REVOLUTION FROM THE 1910S

Specialized equipment and technical services for:
 Exploration, Production and Transport; Plant design and construction
 Measuring and control instruments Special materials (Perforation muds, lubricants, catalysts, etc.)



An opportunity explosion

THE INFORMATION TECHNOLOGY REVOLUTION FROM THE 1970s



Territorial embeddedness and the characteristics of the paradigm shift

**INSTALLATION PERIOD:
Difficult adaptation**

**Resistance from established firms
and from the established institutions**

**Turbulent paradigm shift
led by financial capital**

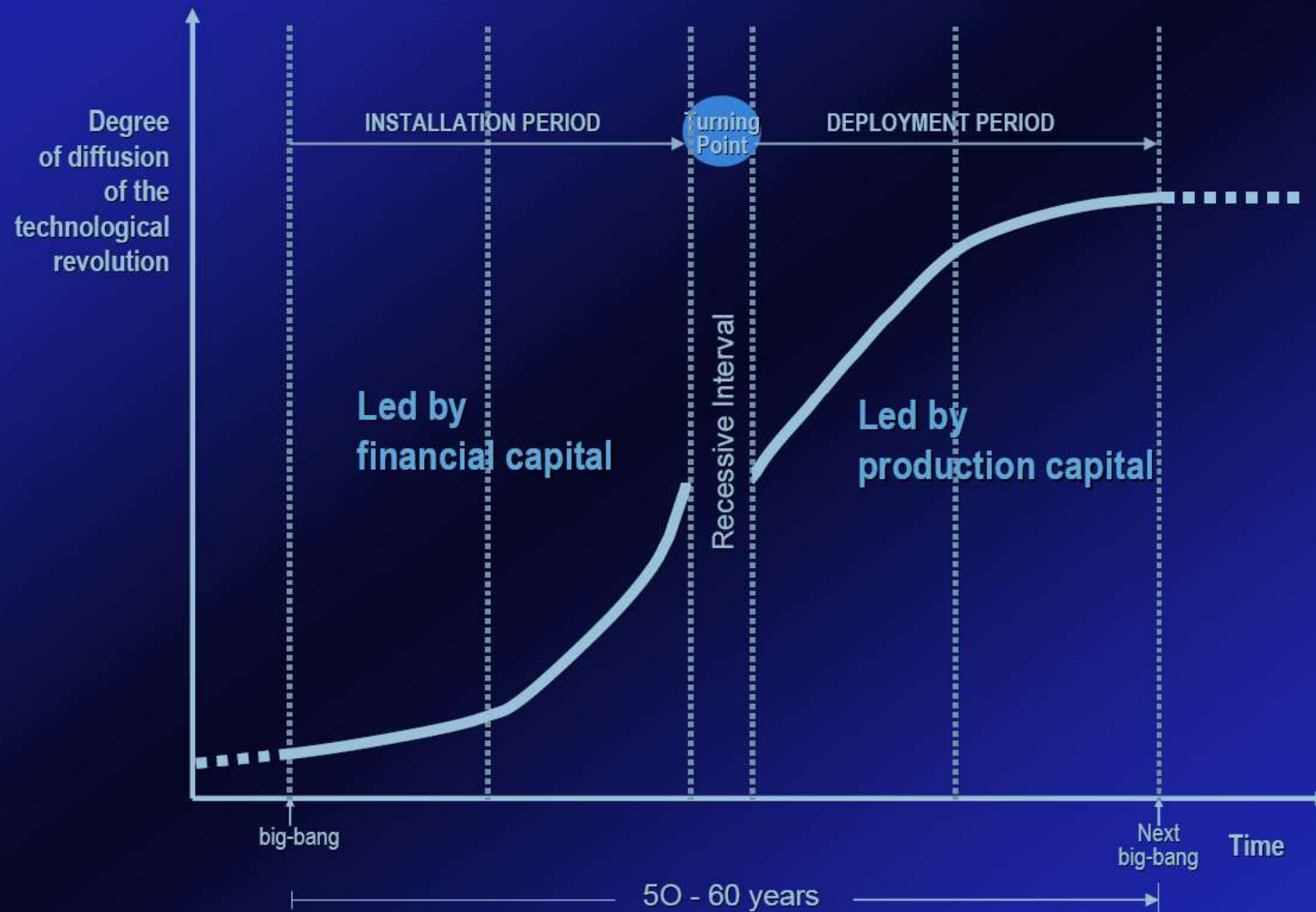
**DEPLOYMENT PERIOD
“Hyperadaptation”**

**Full propagation of the higher
wealth creating potential led
by production capital**

**Innovations outside the paradigm
are shaped “to fit”, excluded
or marginalized**

The diffusion of a technological revolution

TWO DIFFERENT PERIODS IN EACH GREAT SURGE



The story of the other side

- Carlota Perez also indicates the sixth cycle:
 - Possibly biotechnology, bioelectronics, nanotechnology, and new materials, as they seem to be in gestation.
 - Transistors were in gestation during 1950s
- More about these waves later
 - Disruptive technologies by Clayton Christensen

Links to System Dynamics. In addition to a shared focus on evolutionary change, an obvious link between system dynamics and radical political economics is the economic long wave, or Kondratiev cycle. The system dynamics national model generates, among other behavior modes, a 40-60-year macroeconomic cycle, or long wave (Forrester 1979). This